



Its Not Oil and Water: Blending Climate Change Solutions with Sustainable Development in New England

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University of New Hampshire**

Vital Communities

19 Jan 2012



NH Governor & Executive Council ask PSNH on 30 Nov 2011

Were You Ready for the Storm?



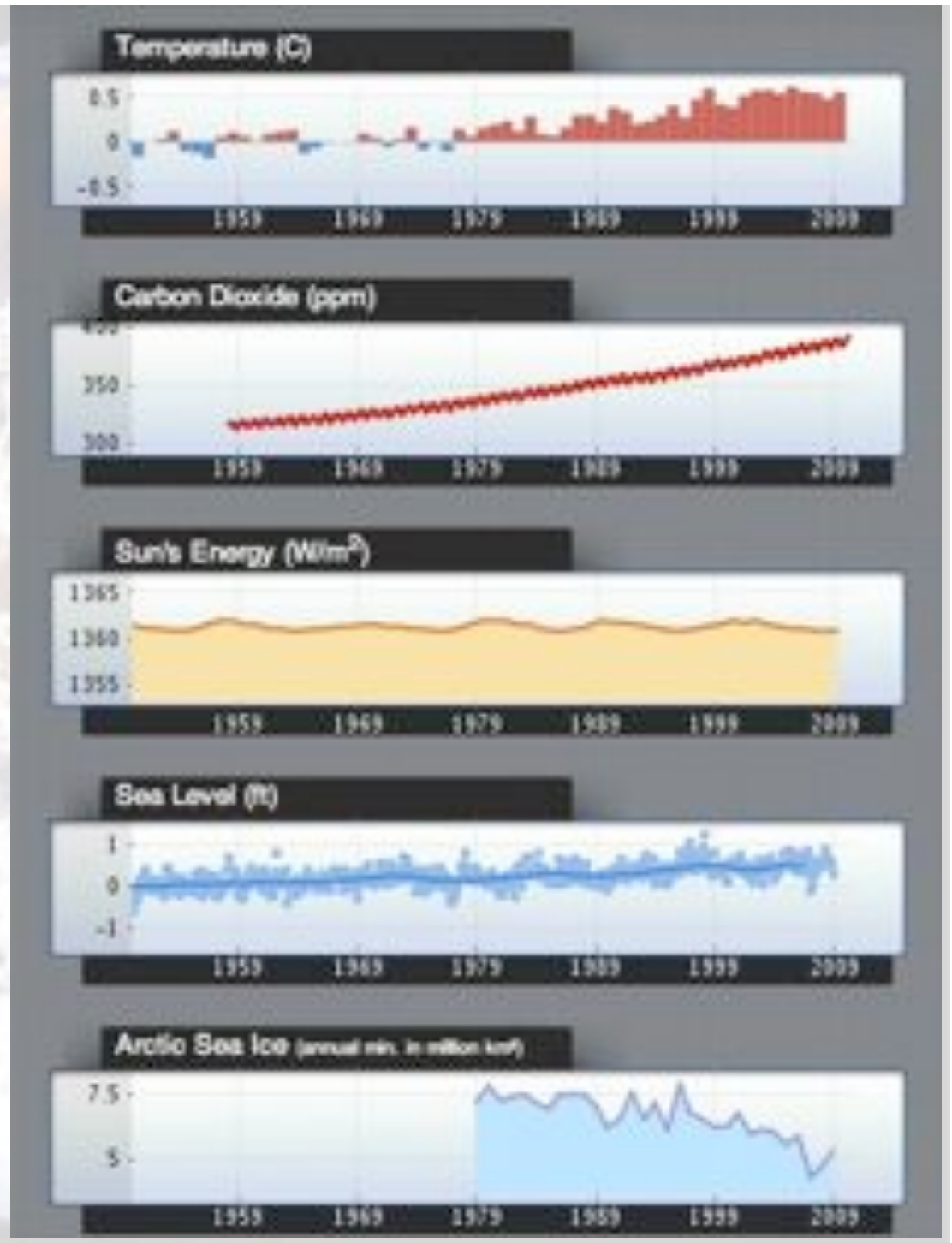
NASA Earth Observatory Image 30 October 2011

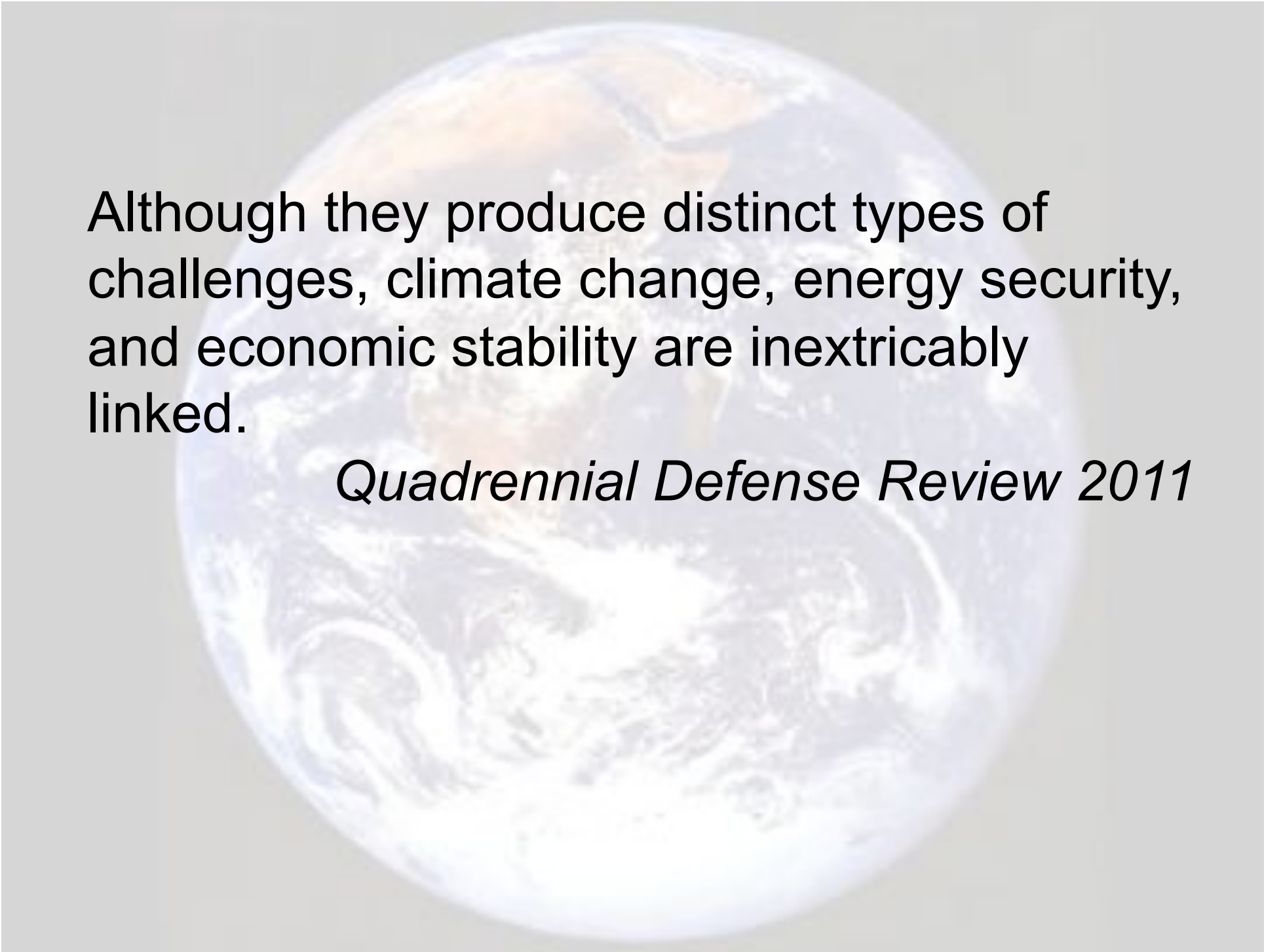
NOAA Climate Services

Global Climate Dashboard

Climate Change

www.climate.gov





Although they produce distinct types of challenges, climate change, energy security, and economic stability are inextricably linked.

Quadrennial Defense Review 2011

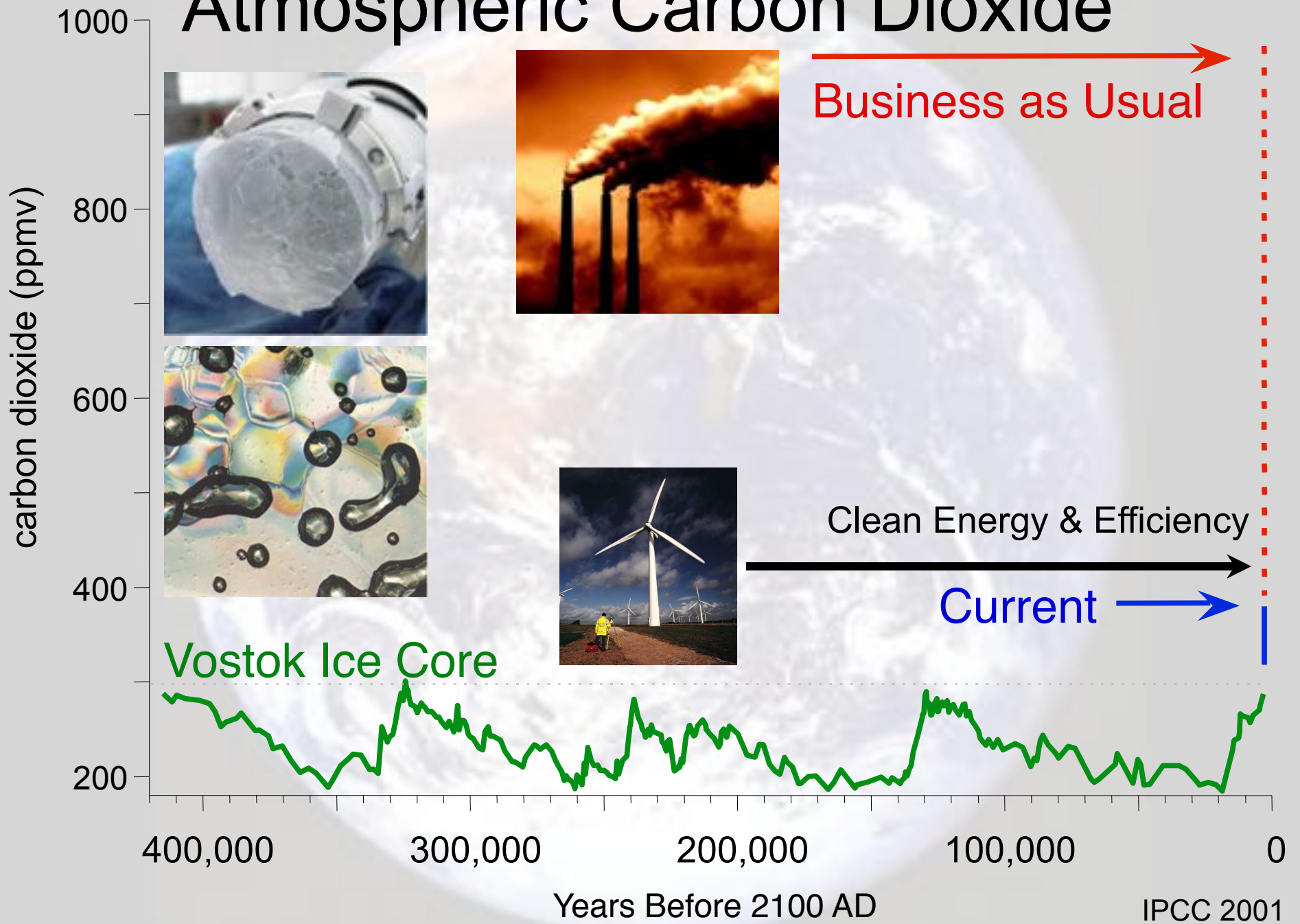
EARTH: The Operators' Manual premiered April 2011.
[Check Local Listings](#) to see when it is airing on your local PBS station.



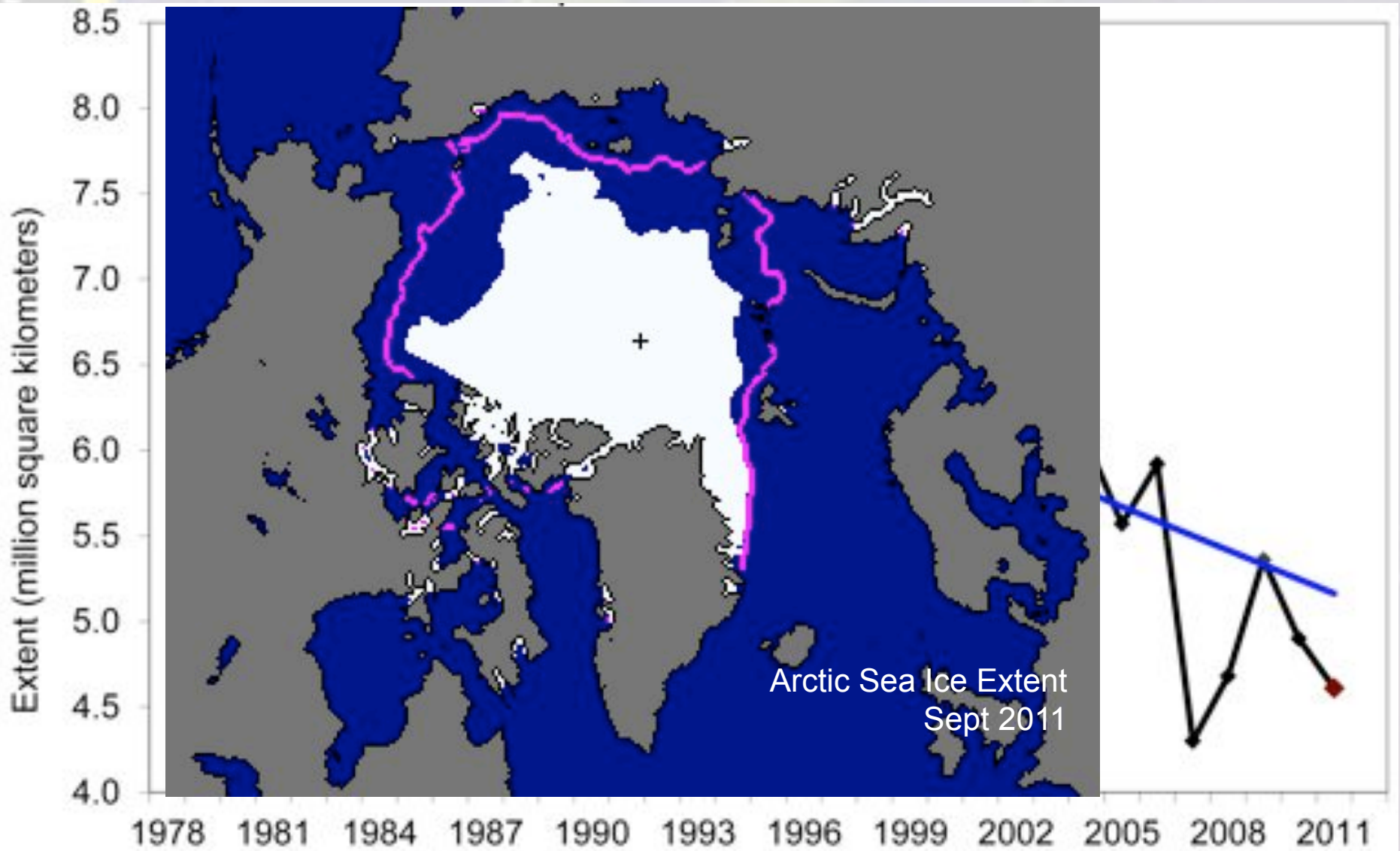
Things that are important to us, like cars and computers, come with manuals. So why not a manual for the most complex operating system of all—the Earth. Is the planet due for an oil change? What do we need to do to keep Earth operating at peak performance? These are some of the questions addressed in *Earth: The Operators' Manual*, a one-hour special on climate change and sustainable energy, premiering at 10pm on Sunday April 10th during Earth Month 2011.

<http://www.pbs.org/programs/earth-the-operators-manual/>

Atmospheric Carbon Dioxide

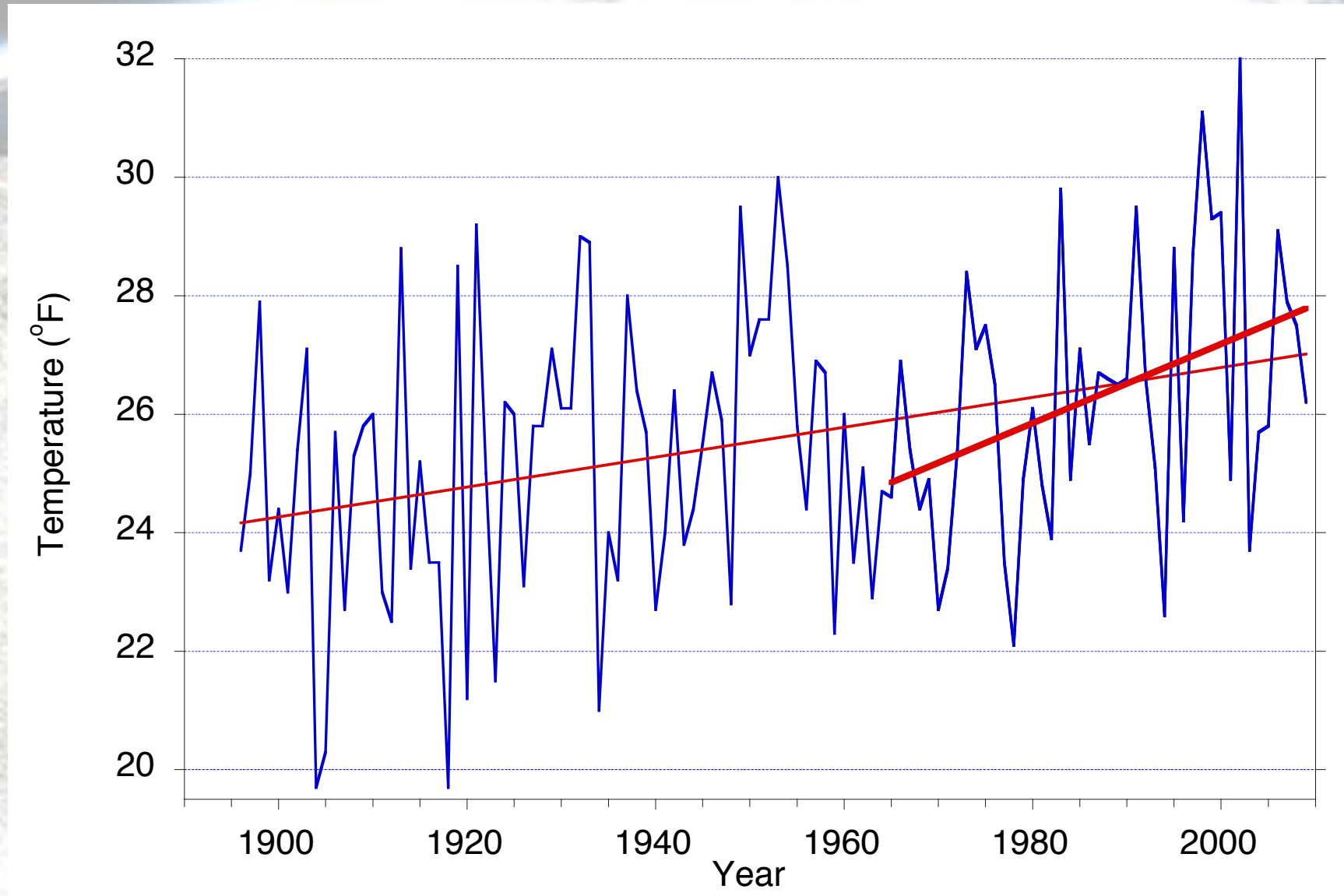


September Arctic Sea Ice Extent 1979 - 2011

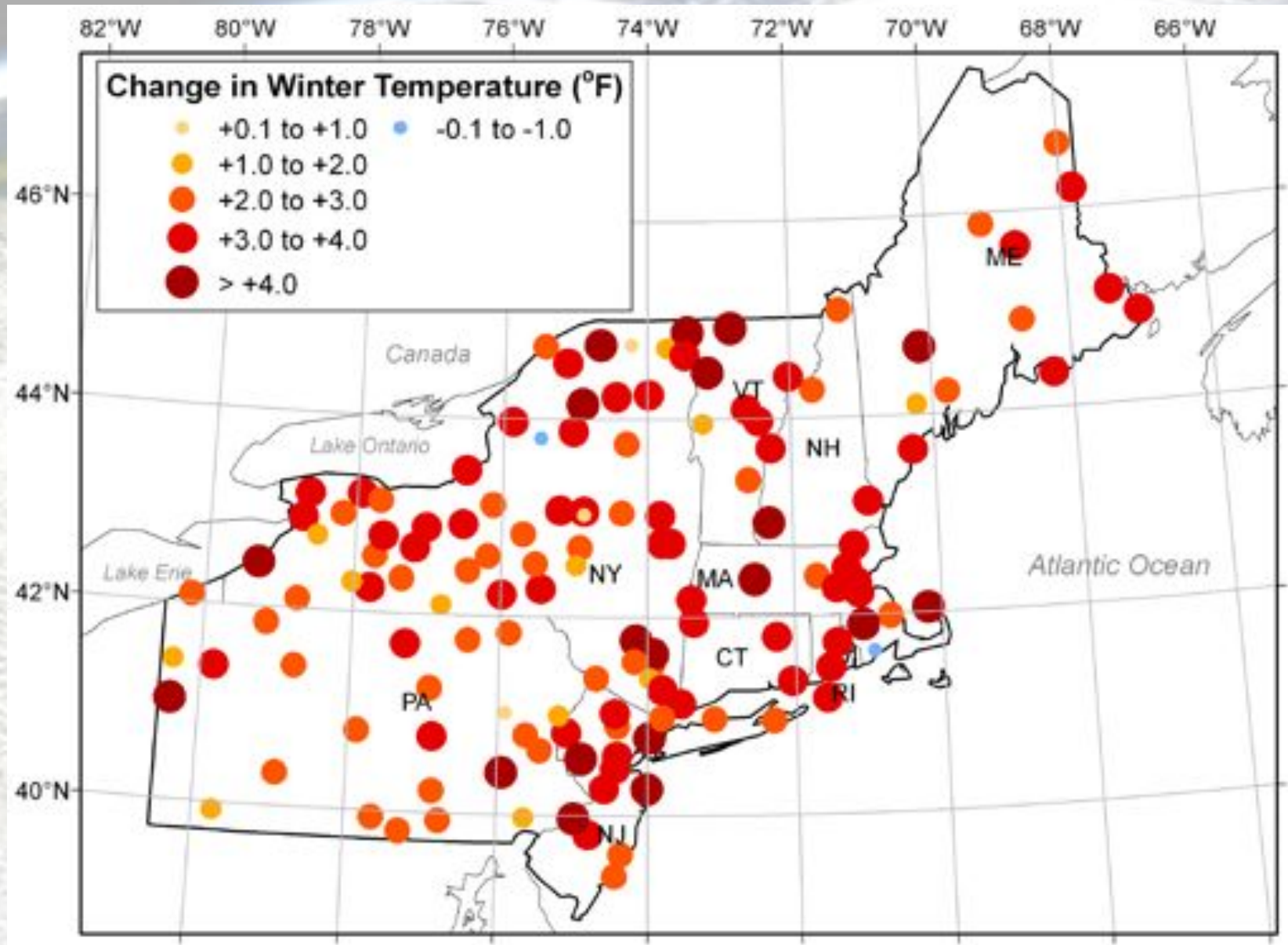


National Snow and Ice Data Center <http://nsidc.org>

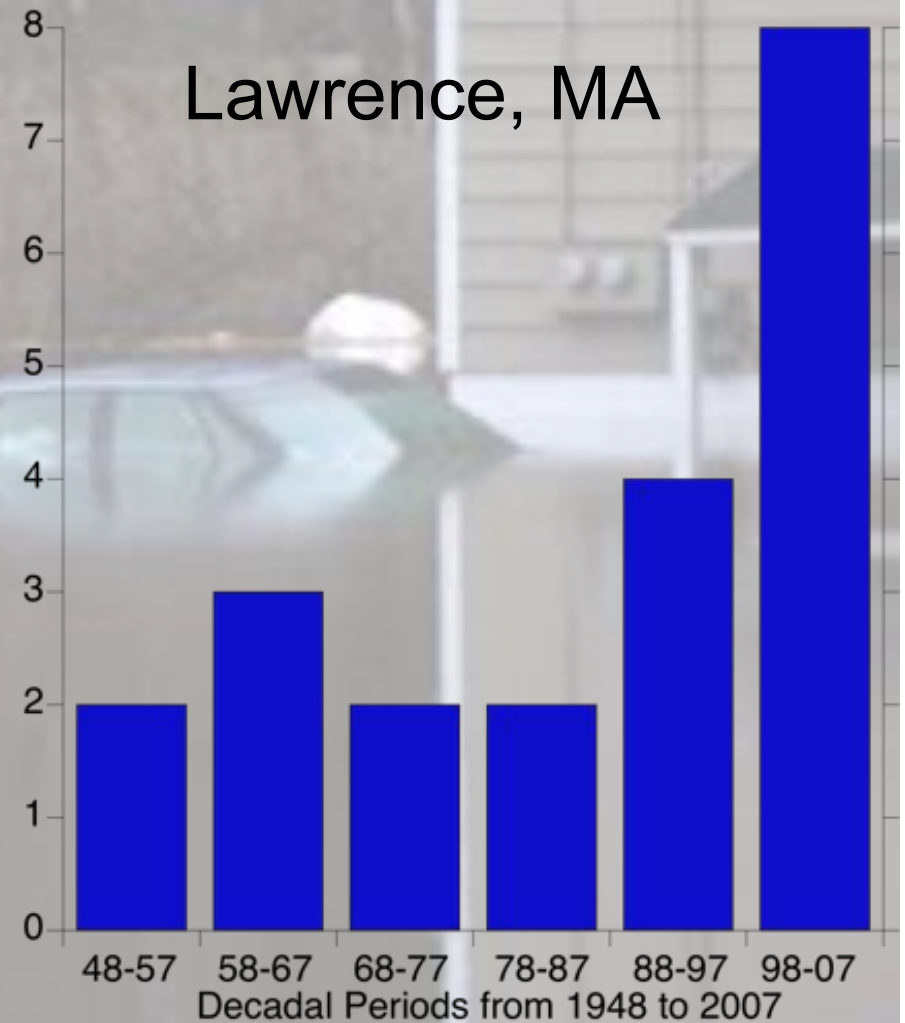
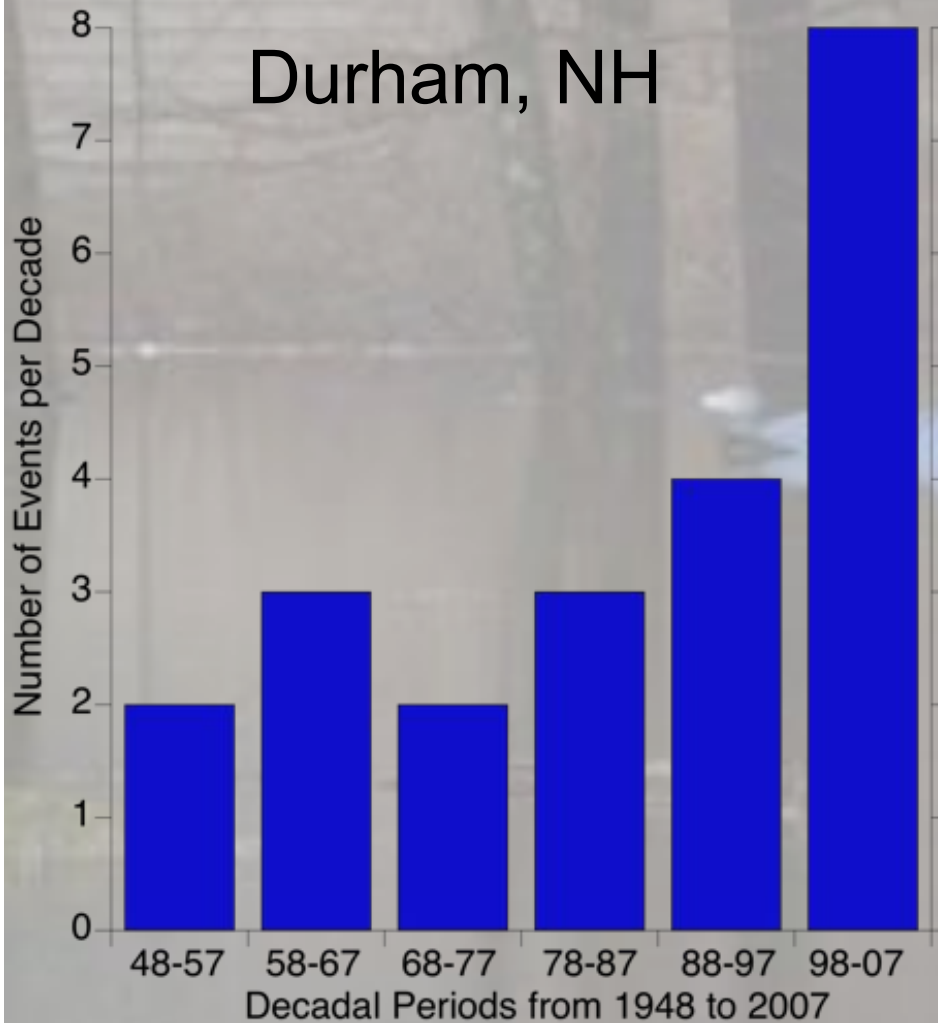
Northeast Winter Temperature Trends 1895-2005



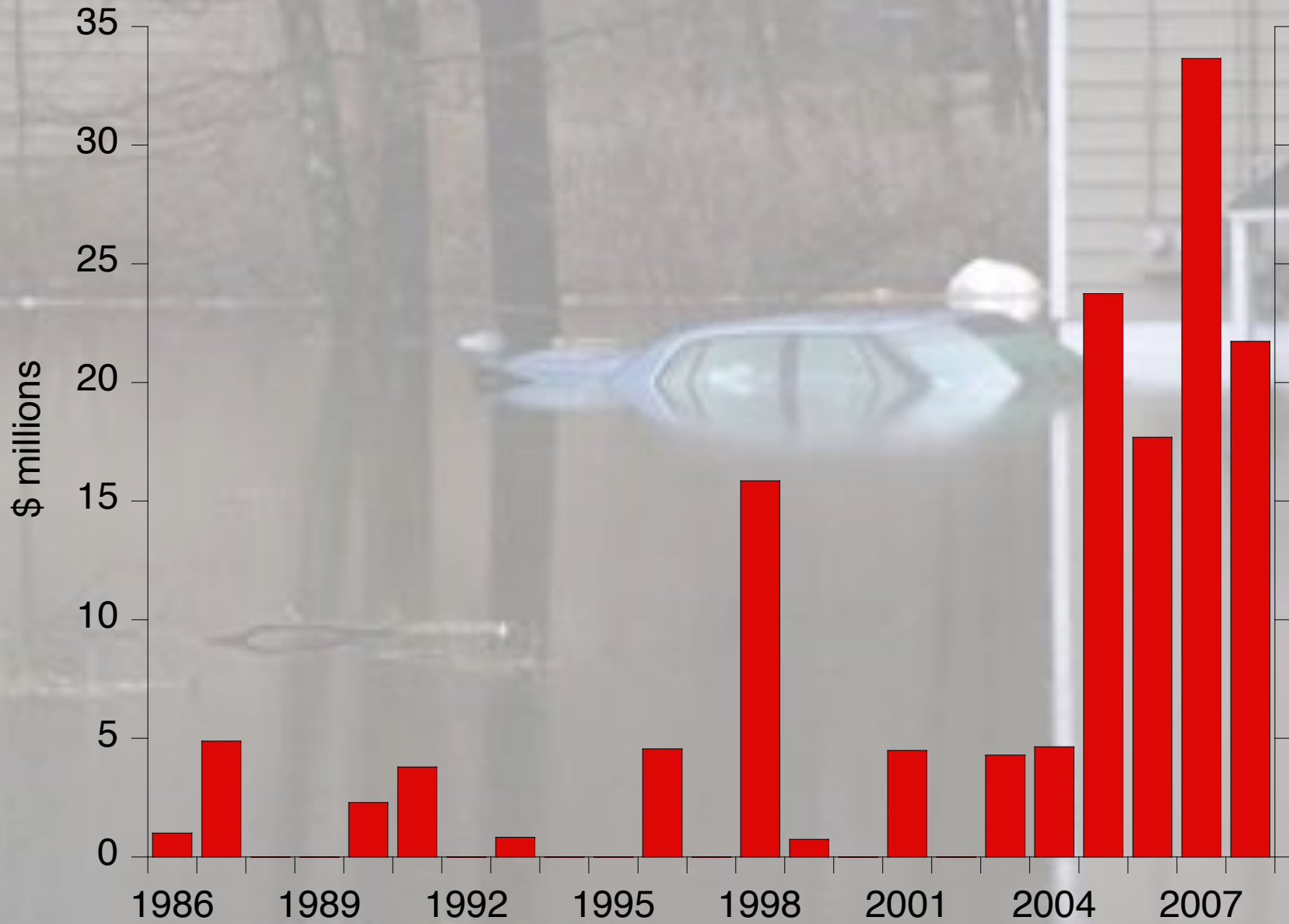
Northeast Winter Temperature Trends 1965-2005



4 Inch Precipitation Events by Decade 1948 - 2007



Costs from Presidentially Declared Disasters in NH



Indicators of Climate Change in the Northeast US over the last 30-40 yrs

- **Winter warming**
- **Fewer days with snow on ground**
- **Lake ice out dates earlier**
- **Lilac bloom dates earlier**
- **More frequent extreme precipitation**
- **Earlier spring runoff**
- **Sea levels continuing to rise**

Hodgkins et al., 2002; 2003; Wolfe et al., 2005;
Wake and Markham, 2005; Wake et al., 2006,2009,2011; Burakowski et al., 2008

Northeast Climate Impacts Assessment

A Report of the Northeast Climate Impacts Assessment

Confronting Climate Change in the U.S. Northeast



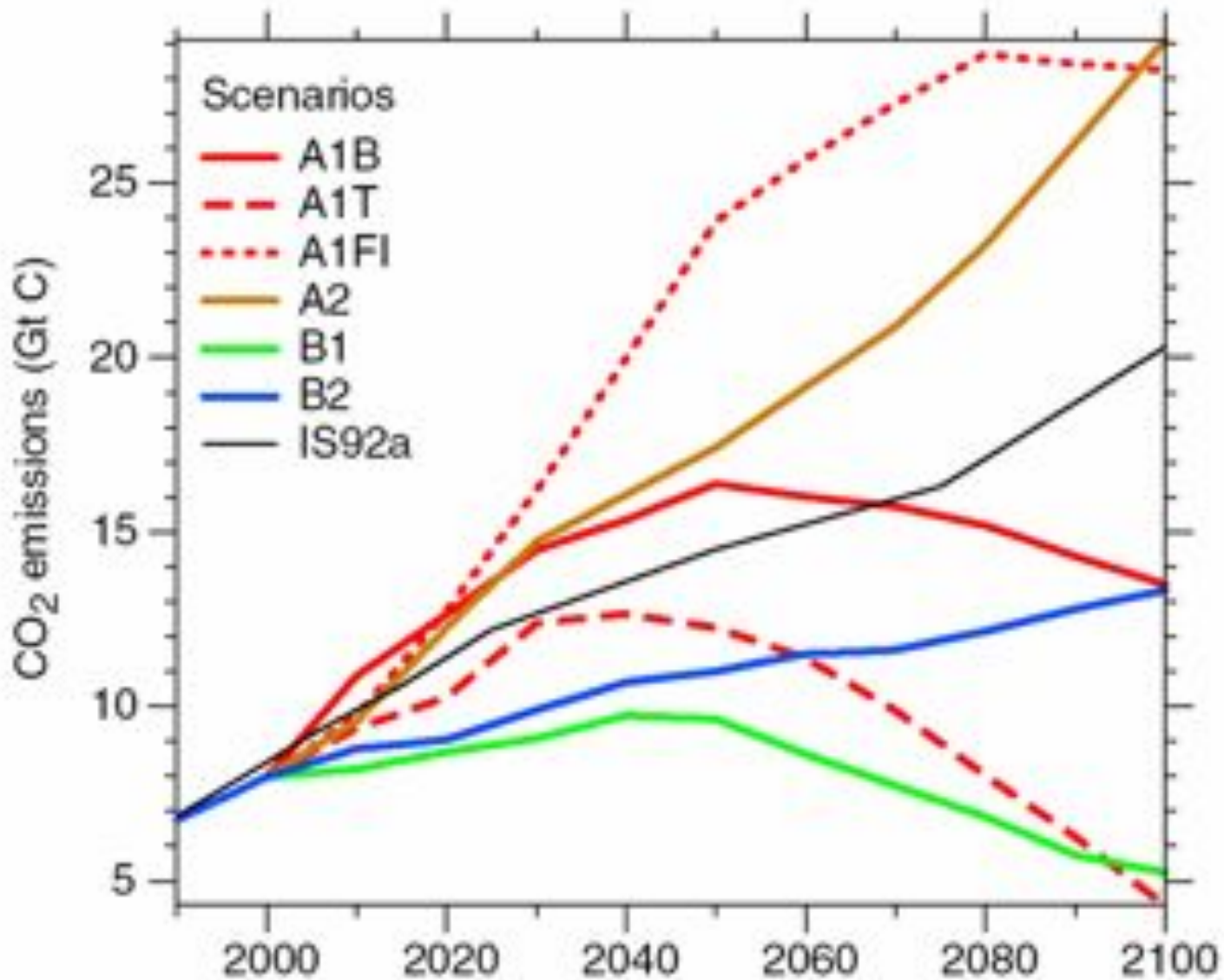
SCIENCE, IMPACTS, AND SOLUTIONS

JULY 2007

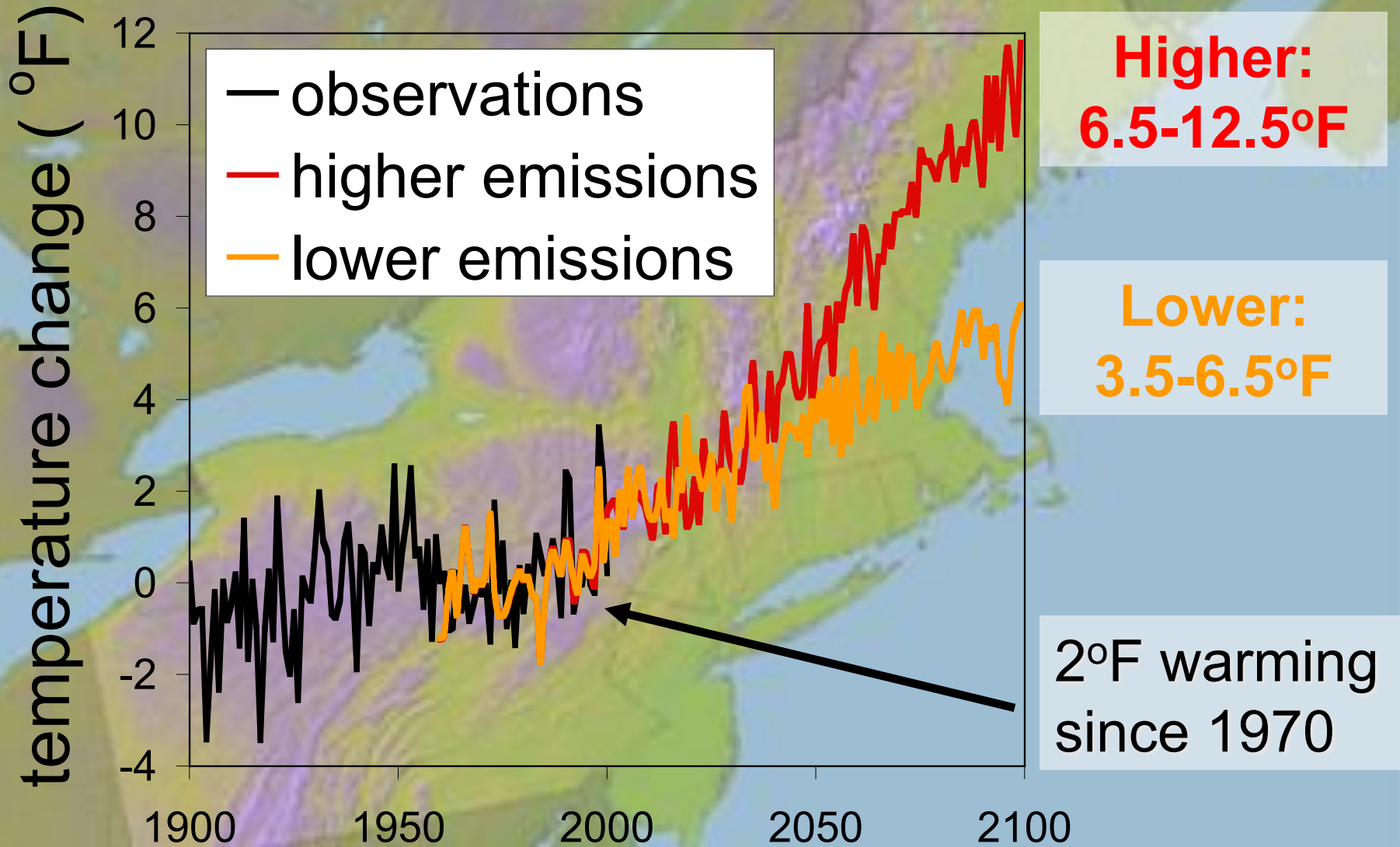
www.climatechoices.org

- Collaboration between Union of Concerned Scientists and 50 independent scientists
- **Geographic Scope**
Nine Northeast states, from Maine to Pennsylvania
- **Peer Review**
Climate Dynamics, 2007
14 papers in *Adaptation and Mitigation of Climate Change*, 2008

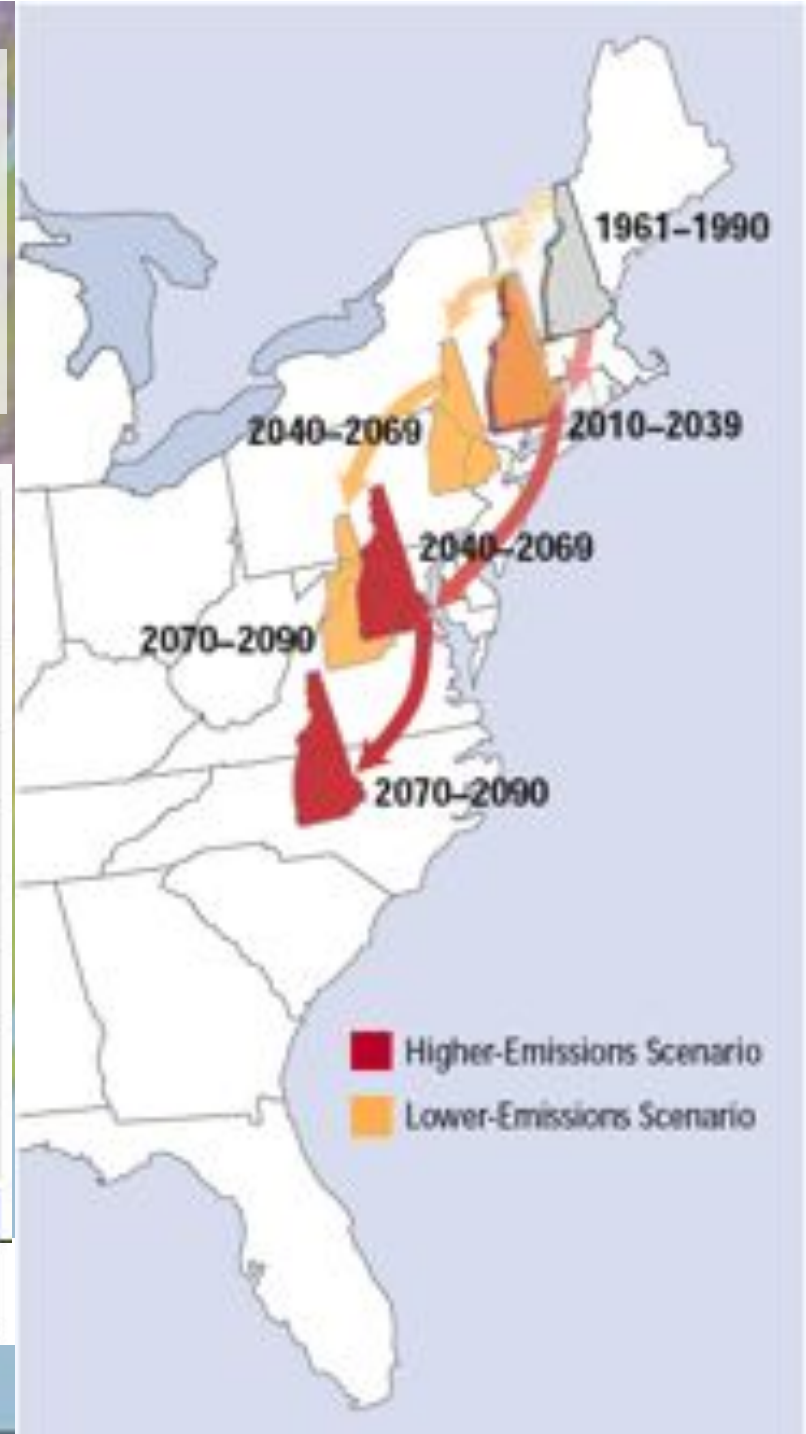
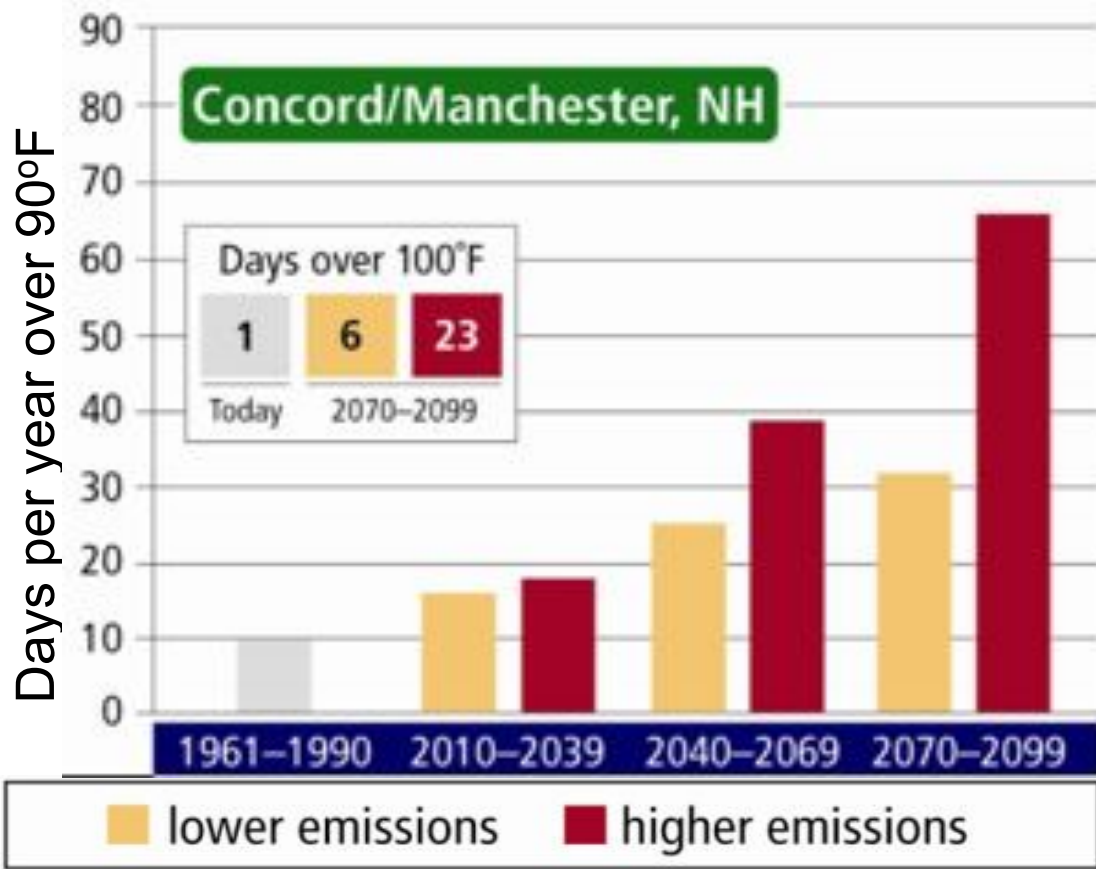
Projecting Future Climate Change for the Northeast: Greenhouse Gas Emission Scenarios



Projecting Future Climate Change for the Northeast: Rising Annual Temperatures



Summer heat index: *How hot summers will “feel” in New Hampshire*



Extreme Precipitation Events Increase

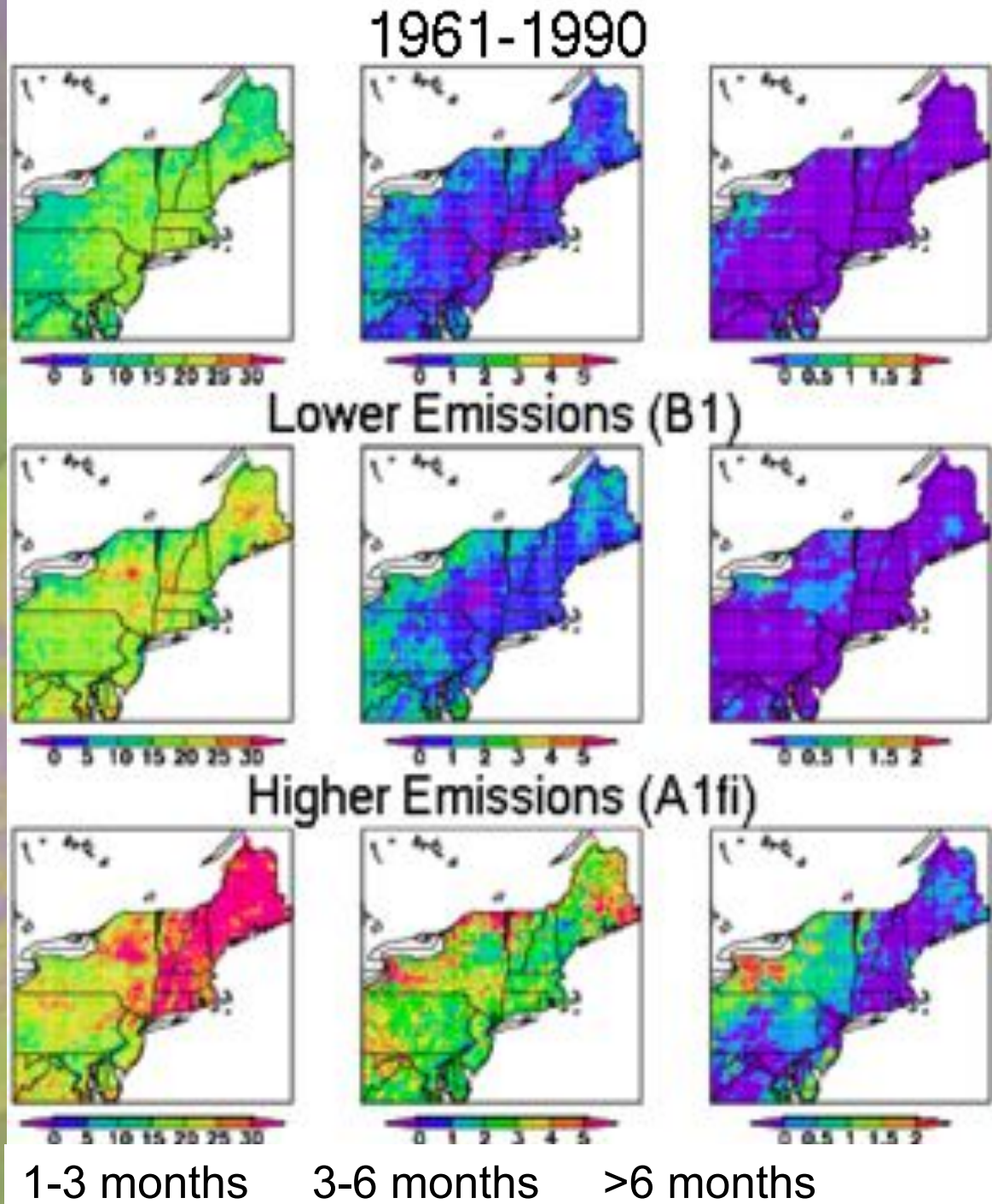
- Heavy rainfall events are becoming more frequent across the Northeast
- Under both emissions scenarios
 - rainfall is expected to become more intense
 - periods of heavy rainfall are expected to become more frequent



Bridge over Axe Handle Brook, Rochester, NH
May 2006.

credit: Associated Press

Drought

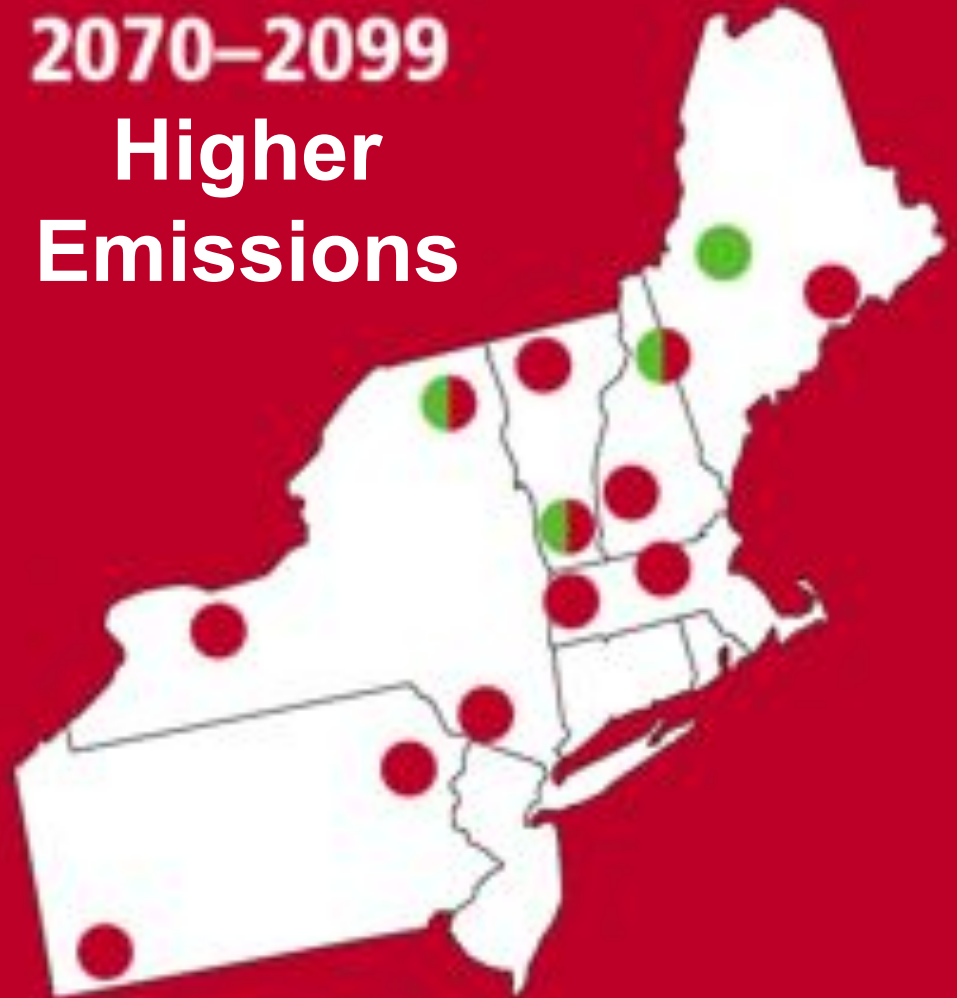


Vulnerability of Ski Resorts to Climate Change



- highly vulnerable
- vulnerable
- viable

2070–2099
Higher
Emissions



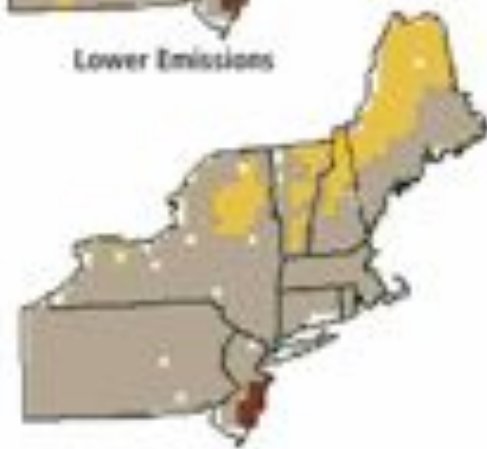
Changes in Habitat Suitability for Different Forest Types



Current



Lower Emissions



Higher Emissions



Spruce/Fir



Maple/Beech/Birch



Oak/Hickory



Elm/Ash/Cottonwood



Loblolly/Shortleaf Pine



Other



No Data

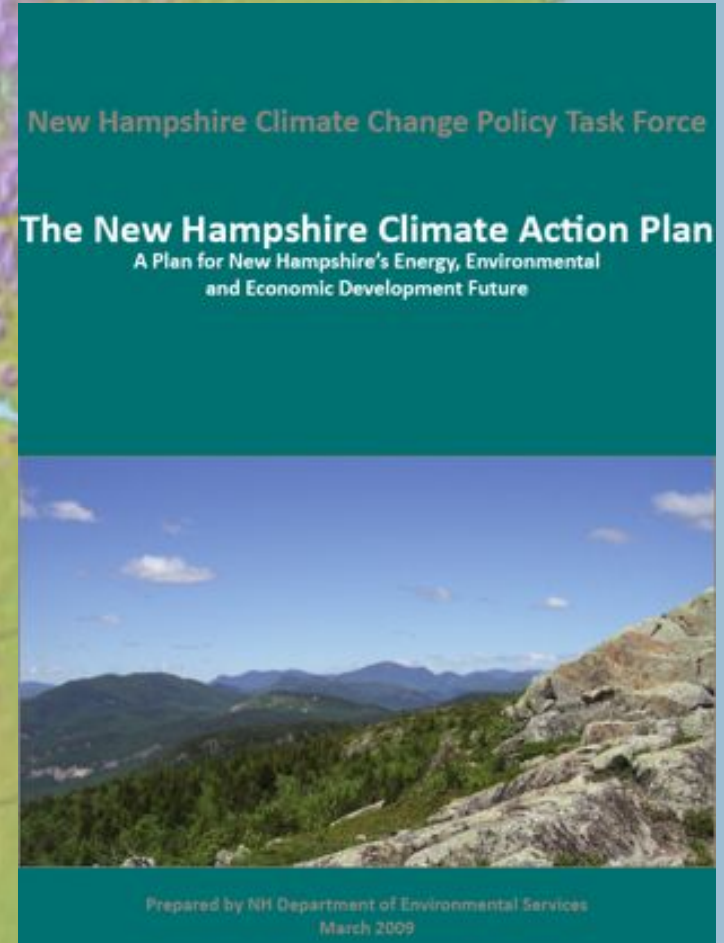


AP Photo/Robert F. Bukaty



NH Climate Action Plan

- One of the largest, most diverse collections of leading NH citizens
- Promotes growth of new jobs and renewable energy development
- Reduces energy costs
- Identifies 67 recommended actions
 - buildings
 - electricity generation,
 - transportation & land use
 - natural resources
 - government action
 - adaptation
- Reduce greenhouse gas emissions
 - 44% below 2005 levels by 2025
 - 86% below 2005 levels by 2050

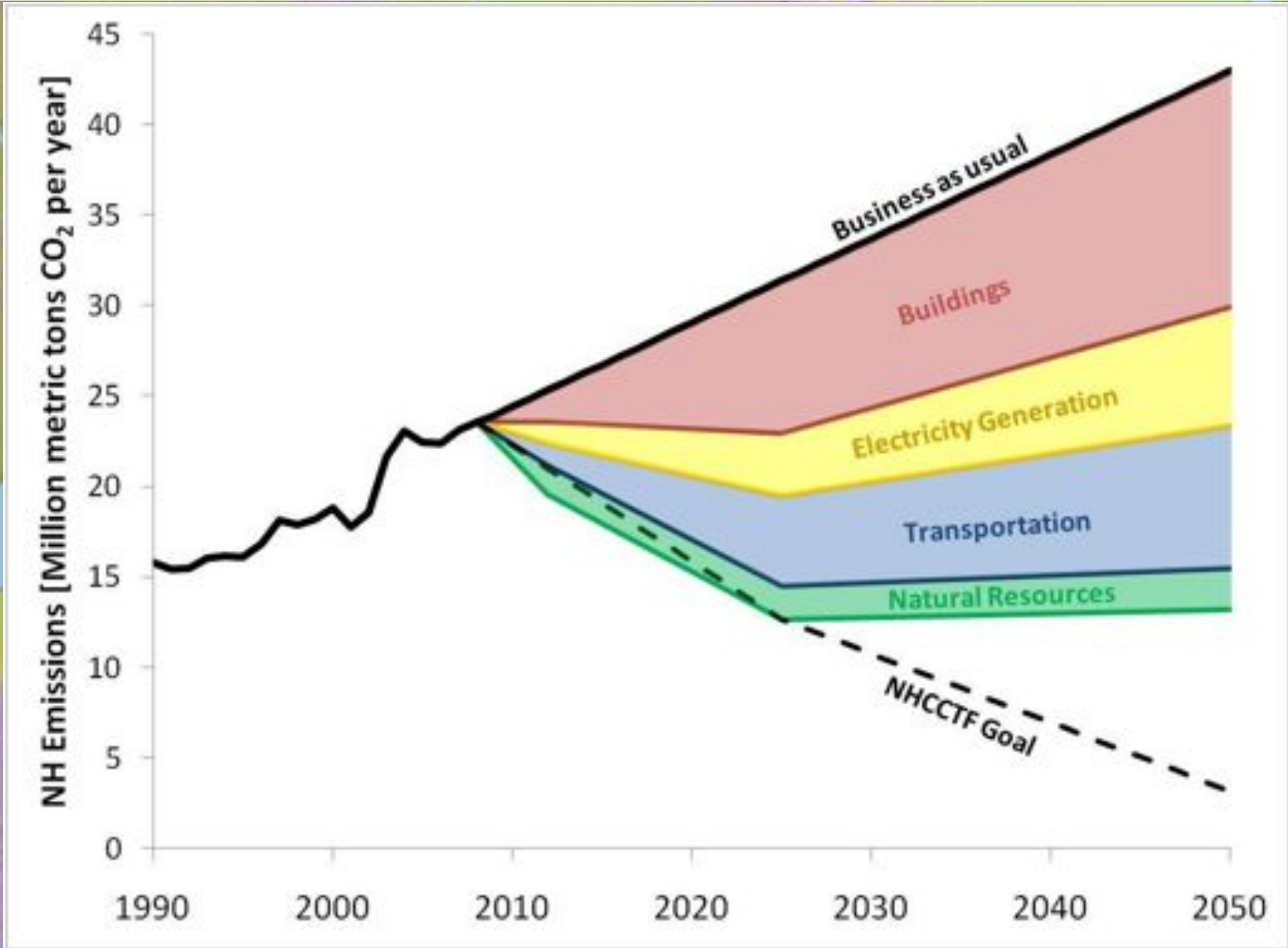


More info at:
<http://CarbonSolutionsNE.org>

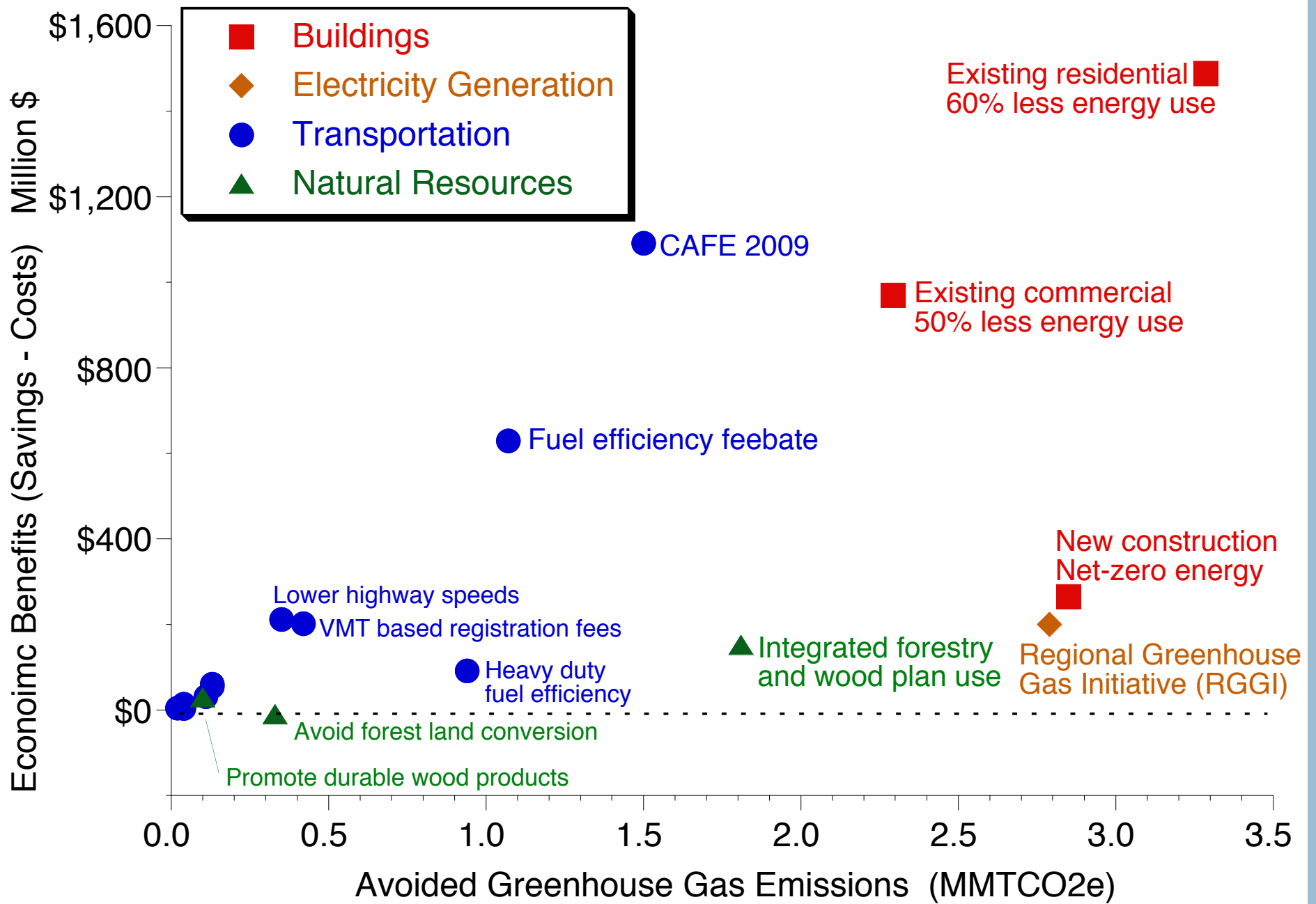
Overarching Strategies to Achieve Goals

1. Maximize energy efficiency in buildings & transportation
2. Increase renewable & low-emitting heat & electric power sources
3. Protect our natural resources to enhance the amount of carbon sequestration
4. Develop an integrated education, outreach and workforce training program
5. Develop plans to adapt to existing and potential climate change

New Hampshire Climate Action Plan (March 2009)



New Hampshire Economic Benefits vs Avoided CO2e Emissions in 2025



Interactions Among Climate, Land Use, Ecosystem Services, and Society

NSF Funded Project via NH EPSCoR

Overarching Goals:

- Better understand complex interactions among climate, land use, ecosystem function and services, and society;
- Build capacity for competitive research

Terrestrial and Aquatic Ecosystem Services Research:

- Collect data from state-of-the-art sensors to document the current status of natural and managed NH ecosystems in regions experiencing stresses from climate, natural disturbance, and human use
- Use data to improve and validate a set of linked regional climate and ecosystem models to explore potential future impacts

NH Energy & Climate Collaborative



Supports a network of energy and climate leaders and organizations in an effort to leverage opportunities and remove barriers to implementation of the most significant recommendations in New Hampshire's Climate Action Plan.

Measurement, Connection & Building Network Capacity

- Scorecard
- Engage Leaders
- Problem Solving Workgroups
- Support Energy & Climate Organizing Groups
- Collaborative Connector, Statewide Education & Outreach

New Hampshire Sustainable Communities Initiative Project Summary

PROJECT TITLE: New Hampshire Sustainable Communities Initiative

LEAD APPLICANT: Nashua Regional Planning Commission

PROJECT DIRECTOR: Kerrie Diers, Executive Director Nashua RPC

CONTACT: (603) 424-2240 x12; kerried@nashuarpc.org

POPULATION LEVEL: Large Region – Total Population: 1,316,470

APPLICATION CATEGORY: Category 1

TOTAL BUDGET: \$4,565,039

HUD REQUEST: \$3,369,648

APPLICANT MATCH: \$1,195,391

CONGRESSIONAL DISTRICTS: All NH Districts

LOCATIONS INCLUDED: State of New Hampshire, including the territory of:

Metropolitan Planning Organizations/Regional Planning Commissions:

- Nashua Regional Planning Commission
- Rockingham Planning Commission
- Southern NH Planning Commission
- Strafford Regional Planning Commission

Rural Regional Planning Commissions:

- Central NH Planning Commission
- Lakes Region Planning Commission
- North Country Council
- Southwest Region Planning Commission
- Upper Valley Lake Sunapee Regional Planning Commission



Climate Change in the
Piscataqua/Great Bay Region:
Past, Present, and Future



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Anne Stoner
Texas Tech University

Chris Watson
Ellen Douglas
Univ. of Massachussets
Boston

<http://CarbonSolutionsNE.org>

What can municipalities do now to plan for future events like Tropical Storm Irene?

How can we work together as a region to apply the lessons learned from past experiences?

How do the state and the towns retrofit existing infrastructure to protect it in the future?

How does (or should) climate change impact local and regional decisions on where land is developed by the private sector?

How does adaptation impact the type and location of FUTURE public infrastructure?